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Sir:

Transmitted herewith for filing is the Patent Application of:

SMALL ENTITY

Inventor(s): Giovanni MANFRE' - Mario LOCATELLI

For: VEHICLE REAR-VIEW MIRROR WITH WIDE VIEWING ANGLE AND REDUCED
IMAGE DISTORTION

Enclosed are:

☐

Small Entity verified Statement. will follow

☒

Four sheets of drawing on strong paper (M.P.E.P. 608.02 - rev. 81)

☐

An Assignment of the Invention to _____

☐

A Certified Copy of a _____ Application

☐

Associate Power of Attorney

CLAIMS AS FILED					
	(1) for	(2) number filed	(3) number extra	(4) rate	(5) basic fee \$ 345.=
Total claims		9 - 20 =		x \$ 9.=	
Independent claims		2 - 3 =		x \$ 39.=	
				Total filing fee	\$ 345.=

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Milan, Italy

March 21, 2000



Guido MODIANO

(Reg. No. 19,928)

03/23/00
jc535 U.S. PTO

jc515 U.S. PTO
09/533215
03/23/00

09/533215
03/23/00

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Milano, March 21, 2000

New US Application in the name of

Giovanni MANFRE'

Mario LOCATELLI

Agent's Docket: 33471/GM/vp

Hon.

COMMISSIONER OF PATENTS AND TRADEMARKS

WASHINGTON D.C. 20231

U. S. A.

Transmitted herewith are the following papers for filing a new Application:

1. Specification and claims; Declaration/Power of Attorney **UNSIGNED** and attached thereto;
2. **Four** Drawings on strong paper accompanying the specification (M.P.E.P. 608.02-rev. 81);
3. Deposit Account order for Filing Fee : \$ **345** dated **March 21, 2000** (duplicate);
- ~~4. Deposit Account order for Assignment fee : \$ 40 dated~~
- ~~5. Assignment of the Invention to:~~
6. Small Entity verified Statement **will follow.**

PLEASE SEND US THE NOTICE TO FILE MISSING PARTS OF APPLICATION (FILING DATE GRANTED) AS SOON AS POSSIBLE.

The priority of the here-under listed Application(s) is respectfully claimed:


- Italian Application No. **PD99A000062** filed **March 25, 1999**
- ~~– Italian Application No. filed~~

A Certified Copy of the priority Application(s) **will be sent in due course/is attached.**

Please place of record in the file the enclosed papers and kindly acknowledge receipt thereof; please readily collect the credit specified in the Deposit Account order, so as to allow the Application to receive the earliest possible filing date, within:

MARCH 25, 2000

Respectfully submitted



Guido MODIANO
(Reg. No. 19,928)

Encls.:

- Spec./claims + Declaration/Power
- Formal drawings
- Filing Fee Dep. Acc. order (duplicate)
- ~~–Assignment + Fee dep. Acc. order~~
- ~~–Certified Copy~~
- ~~–Small Entity Verified Statement~~

APPLICATION
FOR
UNITED STATES OF AMERICA

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that We,

Giovanni MANFRE'
of CALDIERO – ITALY

and

Mario LOCATELLI
of MOZZO - ITALY

both Italian citizens

have invented certain improvements in

**“VEHICLE REAR-VIEW MIRROR WITH WIDE VIEWING ANGLE
AND REDUCED IMAGE DISTORTION”**

of which the following description in connection with the accompanying drawings is a specification, like reference characters on the drawings indicating like parts in the several figures.

BACKGROUND OF THE INVENTION

The present invention relates to a rear-view mirror with a wide viewing
5 angle and reduced image distortion, which is accordingly adapted for
external mirror for vehicles.

With a mirror of this type it is possible to achieve a viewing angle of up
to 85° without unacceptable distortion of the image. Furthermore, a single
uninterrupted image is provided over the entire reflecting surface.

10

Conventional flat or slightly curved rear-view mirrors for vehicles
installed outside the cabin do not allow to have a wide viewing angle, which
is usually only approximately 20° or even less.

With a reflecting device of this type the driver is unable to visually detect
15 the presence of, for example, overtaking vehicles, because from a certain
point onwards they enter a blind spot which is not covered by the viewing
angle of the mirror.

This causes considerable danger, since the driver may be induced to
perform maneuvers which he believes to be safe and may instead make him
20 collide with another vehicle which is very close but not visible to him.

In order to obviate this drawback, mirrors have been designed which
have differentiated regions providing flat surfaces next to spherical or
aspheric surfaces.

The use of these mirrors has encountered many limitations, because the
25 reflected image is reduced and distorted.

In particular, a reduced image does not allow to evaluate the distance of
the object being viewed and does not allow to assess its approach speed.

These problems have therefore led to statutory provisions which forbid
the use of these mirrors on cars and commercial vehicles unless they are
30 combined with conventional flat mirrors, known as aspheric mirrors.

Such mirrors achieve a maximum viewing angle of 42° , but they provide two different images: a normal one on the flat mirror and a reduced and distorted one in the outermost aspheric part.

In order to obviate this, innovative technologies, such as the use of miniature TV cameras or other concepts such as a prismatic mirror, have recently been developed; they are interesting but complicated and expensive to apply.

SUMMARY OF THE INVENTION

The aim of the present invention is to provide a mirror which eliminates the problems noted in conventional mirrors currently in use.

Within this aim, an object of the invention is to provide a mirror which allows a wide viewing angle particularly to the side of the vehicle on which it is installed.

Another object is to provide a mirror which does not significantly distort reflected images and forms a single image.

Another object is to provide a mirror which allows the driver of the vehicle to have a reliable perception of the distance of the objects that he sees reflected, even if such objects are moving.

Another object is to provide a mirror which is very easy to manufacture and has an accordingly low cost.

This aim, these objects and others which will become apparent from the description that follows are advantageously achieved by a rear-view mirror with wide viewing angle and reduced single-image distortion, particularly for vehicles, characterized in that it comprises a monolithic body made of transparent plastics in which a surface that faces objects to be detected is flat and an opposite reflecting surface is obtained with an aspheric shape whose radius of curvature R is linked, point by point, to a distance E of the eye of a driver of the vehicle and to an angular magnification M , which is determined beforehand, by the formula:

$$M = \frac{1}{j + \frac{2E}{R}}$$

where:

5 M is the angular magnification of a reflected image;

E is the distance of the eye of the driver or passenger from the surface of the mirror;

R is the optionally variable radius of curvature of a concave mirror in a point of the reflecting surface.

10 If the mirror is spherical, R is the radius of curvature of the reflecting surface. The angular magnification M, which respectively represents the angles under which the eye of the observer sees the object and the virtual image reflected in the mirror, is a more convenient parameter than the transverse magnification of an optical system represented by:

15

$$V = \frac{h'}{h}$$

where:

h is the height or other dimension of the object point above the optical axis (positive) or below the axis (negative), in cm;

h' is the height or other dimension of the image points above the axis (negative) or below the axis (positive), in cm.

BRIEF DESCRIPTION OF THE DRAWINGS

25 Further characteristics and advantages of the invention will become apparent from the detailed description of a preferred embodiment, given by way of non-limitative example and illustrated in the accompanying drawings, wherein:

Figure 1 is a theoretical diagram showing the symbols used in the formulas;

30 Figure 2 is a view of a mirror according to the invention;

Figure 3 is a perspective view of the reflecting monolithic body;

Figure 4 is a sectional view of the reflecting body, taken along the plane IV-IV of Figure 3;

Figure 5 is a diagram of the curve by means of which the reflecting
 5 surface is generated according to a known formula whose parameters depend on E and M, which are set in advance and are related to the design of the car or vehicle;

Figure 6 is a diagram of the angular magnification for a few values of the distance E.

10 DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the above figures, the mirror according to the invention is shown in an exemplifying embodiment in Figure 2, where the reflecting part is designated by the reference numeral 10 and is supported by a frame 11 with which a wing 12 is associated which allows its external connection
 15 to the structure of the vehicle on which it is to be installed.

The reflecting part 10, except for its perimetric configuration, which is not relevant, is illustrated by way of example in Figure 3.

As clearly shown, the reflecting part is constituted by a single monolithic block 13 which is made of a transparent plastics by carrying out methods
 20 which can be, according to the material used, pressure injection-molding or gravity casting, by means of which extremely low roughness can be achieved, allowing to then provide the reflecting surface by deposition of a metal, such as silver or aluminum or chromium.

The reflecting part 10 can also be the surface of a material (aluminum) in
 25 film or panel form which has a very low thickness and is such as to be appropriately embedded in the curved part on the plastic monolithic block during the manufacturing process.

The reflecting surface, designated by the reference numeral 14 in Figure 3, has a configuration which is obtained theoretically from the rotation of
 30 two equations that can be obtained from the remarks that follow and are

respectively design-related and purely optical in their scope.

The design-related equation can be obtained as follows:

Given a chosen magnification angle M , as close as possible to 1 (where 1 is taken to correspond to the surface of an equivalent mirror having a flat reflecting surface and equal dimensions), in order to avoid excessively small and distorted images, the general formula that links the various parameters is as follows:

$$M = \frac{\frac{h'}{E+S'}}{\frac{h}{S-E}} = \frac{h'}{h} \cdot \frac{S-E}{S'+E} = \frac{S'}{S} \cdot \frac{S-E}{S'} = \frac{1-\frac{E}{S}}{1+\frac{E}{S'}} = \frac{1-\frac{E}{S}}{1+E \cdot \left(\frac{1}{S} + \frac{2}{R}\right)} = \frac{1-\frac{E}{S}}{1+\frac{2E}{R} + \frac{E}{S}}$$

which yields, when simplified:

$$M = \frac{1}{1 + \frac{2E}{R}}$$

which is valid when, as actually occurs, the distance E (in cm) between the origin O of the curved mirror and the eye of the observer or vehicle driver is much smaller than the distance S of the observed object.

The parameters of the formula are:

M = magnification angle of the image;

h = height of the object point above the optical axis of the mirror (positive) or below the optical axis (negative), in cm;

h' = height of the image points of the object in the reflecting surface above the optical axis of the mirror (negative) or below the optical axis (positive), in cm;

S = real distance of the object points of the origin O of the mirror (in cm) to the right of the origin;

S' = distance of the virtual image of the origin O of the mirror (to the left), in cm;

R = Radius of curvature of the mirror, which can vary from point to point over part (as in normal "spherical" mirrors) or, as in the invention, all of the

reflecting surface of the mirror, in cm.

Figure 6 plots the angular magnification M as a function of the radius of curvature of a spherical mirror for various distances E of the eye of the observer from the mirror.

- 5 The distance E of approximately 50 cm relates to the mirror of the driver and the distance E of approximately 100 cm relates to the mirror on the passenger side.

It can be noted that for an equal radius of curvature the magnification related to the driver-side mirror is different from the magnification of the mirror on the passenger side; this drawback will be eliminated by a mirror according to the invention, with a variation of R which allows a blind spot which is adequately much smaller and reduced distortion.

The second equation relates to the point variation of R, which is already known and can be obtained from optical calculations which allow to design the approximate curve, which can be generated by rotation about the axis Z, which is parallel to the median axis of the vehicle, and is:

$$Z = \frac{C(x^2 + y^2)}{[1 + [1 - SC^2(x^2 + y^2)]^{1/2}} + A(x^2 + y^2)$$

20 X, Y and Z designate the coordinates of the surface 14 of Figure 3 and the parameters C (curvature factor), S (shape factor), and A (correction factor), which depend empirically on the parameters E and M of the above cited design formula.

The invention allows to design and manufacture a monolithic mirror, on the driver side and on the passenger side, combining the design aspects of the mirror linked to the vehicle with the optical requirements of the reflecting surface in order to have a wide viewing angle and a single image which is not reduced excessively and is not distorted.

The reflecting surface 14, as shown in Figure 4, is achieved by first depositing a leveling coat and then depositing a thin layer of metal which is

in turn covered by an anticorrosion coating.

The surface 15 is treated with water-repellent products after being hardened in order to avoid abrasion or scratching problems.

The metallized aspheric surface can constitute the resistive element
5 which, supplied with electric power, allows deicing and/or defogging of the mirror when required.

As an alternative, the resistive coating can be provided in the surface 15 together with the abrasion-resistant and scratch-resistant coating.

The transparent material used in order to obtain the monolithic block can
10 be a polycarbonate, a polymethylmethacrylate or a similar highly transparent plastic material.

It is also possible to use transparent and electrically conducting plastic materials; in this case, by arranging appropriate electrodes it is possible to achieve complete heating of the monolithic block 13 for deicing and/or
15 defogging.

With a mirror of this type it is possible to achieve a viewing angle of up to 85° without excessive or unpleasant distortion of the single image.

For use in a vehicle, it is sufficient to reach an angle of 60° , which allows to have very good rear view.

20 The advantages of a mirror thus provided are evident.

First of all, blind spots are eliminated, but as a further and important advantage it is possible to eliminate the motorized systems currently used to move the reflecting surface in case of maneuvers when it is necessary to check the position of an obstacle which is normally not visible because it
25 lies in the blind spot.

The elimination of these mechanisms allows to provide a very cheap mirror which is not subjected to malfunctions.

The description and illustrations show that the aim and all the objects have been achieved, providing a mirror with a wide viewing angle.

30 The reflecting coating can also be provided during the formation of the

monolithic body with a molding process which uses an in-mold coating technique or by inserting in the mold a film or a small thin panel which is manufactured separately from the process for manufacturing the transparent monolithic block.

5 The practical embodiments and the dimensions of the mirror can of course be different, starting from the described and illustrated inventive concept, but functionally equivalent in relation to the characteristics of the vehicles, the positions of the seats, the arrangement of the mirror and the percentile values of the driver (height, leg position, seat back angle,
10 etcetera).

It is also noted that the above description, related to increasing the viewing angle in a horizontal direction, can also be applied vertically by turning the mirror through 90°. This allows, especially when the vehicle is not moving or is parked, to check movements with respect to the obstacles
15 and objects that are present on the ground near the vehicle proximate to its rear part.

The materials used may of course be different though having characteristics of the described type.

20 The disclosures in Italian Patent Application No. PD99A000062 from which this application claims priority are incorporated herein by reference.

WHAT IS CLAIMED IS:

1. A rear-view mirror with a wide viewing angle and reduced single-image distortion, particularly for vehicles, wherein it comprises a monolithic plastic body which is made of transparent plastic material and in which a surface that faces objects to be detected is flat and an opposite reflecting surface is obtained with an aspheric shape which is optically generated by the rotation, about an axis which is ideally parallel to a centerline axis of the vehicle on which the mirror is to be installed, of a curve whose equation is:

$$M = \frac{1}{1 + \frac{2E}{R}}$$

wherein M is the angular magnification of the reflected image, E is the distance of the eye of a driver from the surface of the mirror that faces objects to be detected and R is the radius of curvature of the mirror, where R varies point by point by means of an optically known equation which is extracted and obtained empirically with three parameters which depend on the design choice of M and E.

2. The mirror according to claim 1, wherein it is monolithic and said reflecting surface is fully aspheric.

3. The rear-view mirror according to claim 1, wherein said monolithic body made of transparent material is obtained by pressure injection-compression or gravity casting, with low-roughness surfaces which are obtained so as to be perfectly reflective by metallic deposition or by means of a film or low-thickness panel.

4. The rear-view mirror according to claim 1, wherein the reflecting surface is obtained by means of a coating technique or by in-mold coating or by in-mold embedding of reflective panels or films.

5. The rear-view mirror according to claim 1, wherein the reflective surface is electrically conducting and is adapted to constitute a heating element for deicing or demisting said mirror.

6. The rear-view mirror according to claim 1, wherein the flat surface is of a water-repellent and scratch-resistant type.

7. The rear-view mirror according to claim 1, wherein said flat surface is of an electrically-conducting type.

5 8. The rear-view mirror according to claim 1, wherein said aspheric reflecting surface determines a transverse viewing angle of 85°.

9. A rear-view mirror with a wide viewing angle and reduced single-image distortion, particularly for vehicles, wherein it comprises a monolithic plastic body which is made of transparent plastic material and in which a
10 surface that faces objects to be detected is flat and an opposite reflecting surface is obtained with an aspheric shape which is optically generated by the rotation, about an axis which is ideally perpendicular to a centerline axis of the vehicle on which the mirror is to be installed, of a curve whose equation is:

15

$$M = \frac{1}{1 + \frac{2E}{R}}$$

20

wherein M is the angular magnification of the reflected image, E is the distance of the eye of a driver from the surface of the mirror that faces
objects to be detected and R is the radius of curvature of the mirror, where R varies point by point by means of an optically known equation which is extracted and obtained empirically with three parameters which depend on the design choice of M and E.

25

ABSTRACT OF THE DISCLOSURE

A mirror with wide viewing angle and reduced image distortion, to be used as an external rear-view mirror for vehicles which is obtained
5 monolithically by pressure injection-molding or gravity casting of a highly transparent material and its external incident surface is flat, while the reflective rear part is obtained by means of an aspheric surface which is generated by the rotation, about an axis which is ideally parallel to the centerline axis of the vehicle, of a curve which determines, with good
10 approximation, a profile which avoids significant deformation of the reflected images.

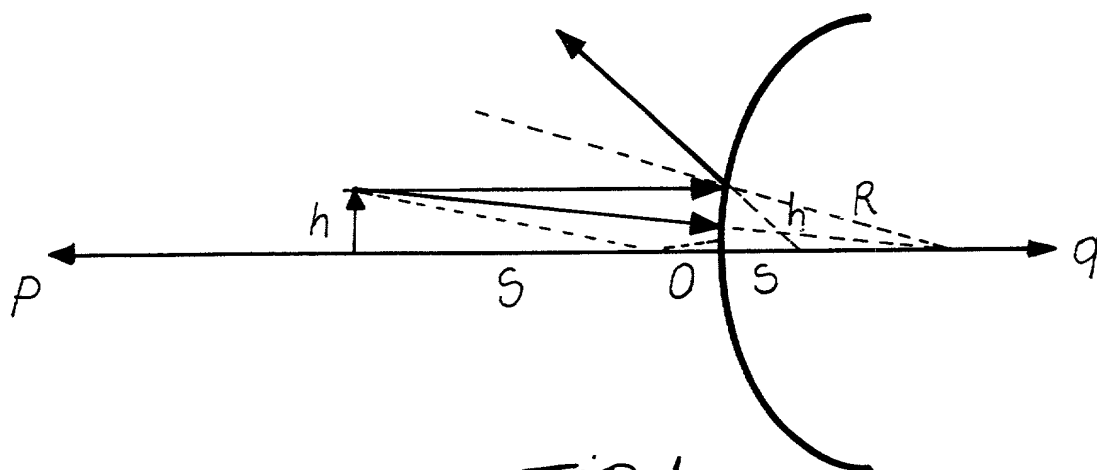


Fig. 1

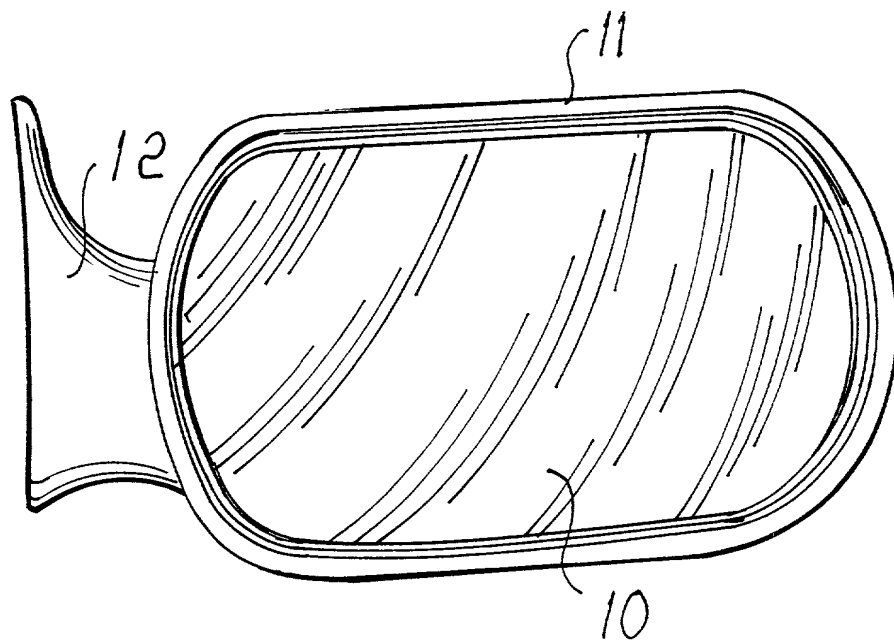


Fig. 2

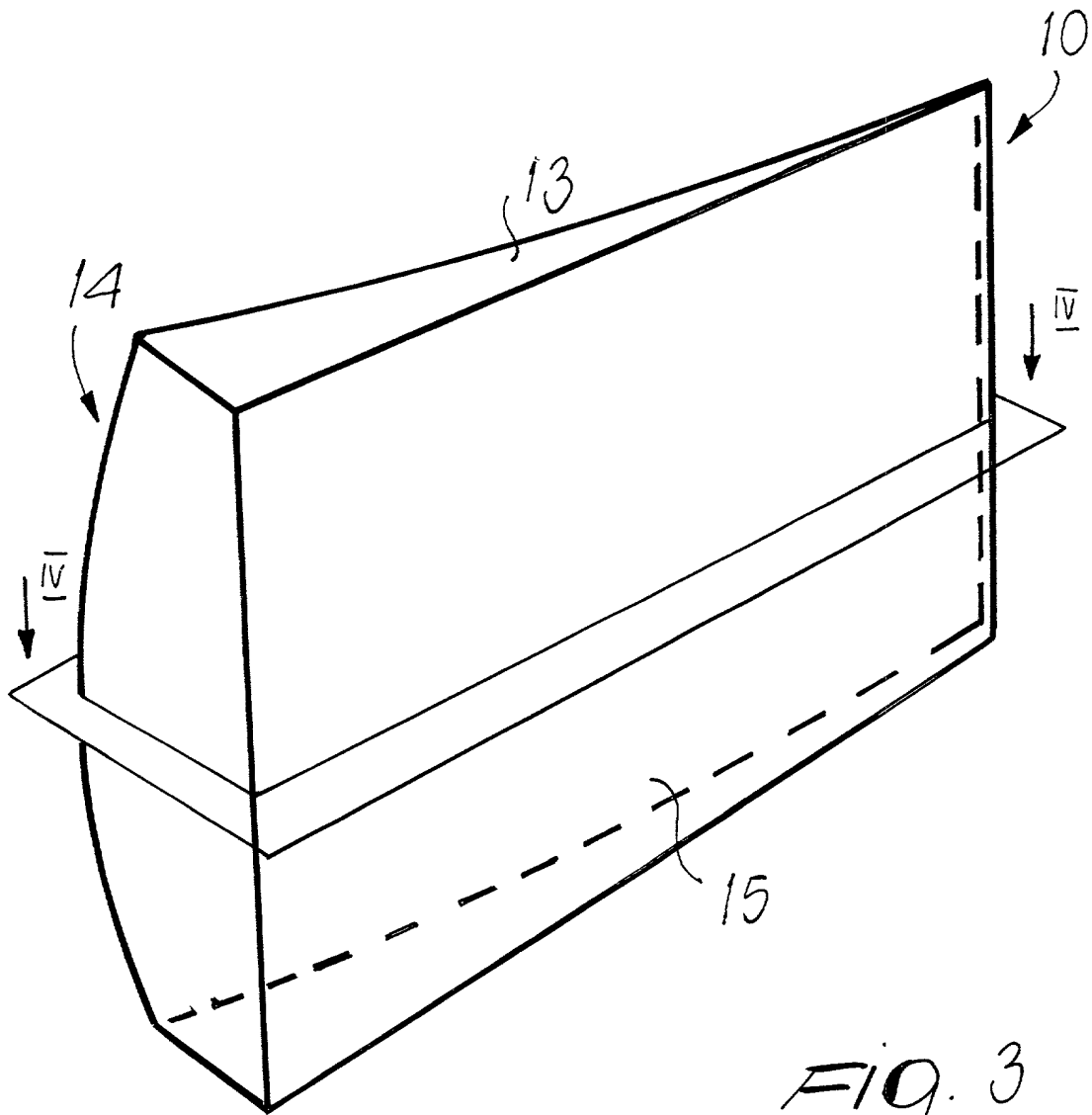


FIG. 3

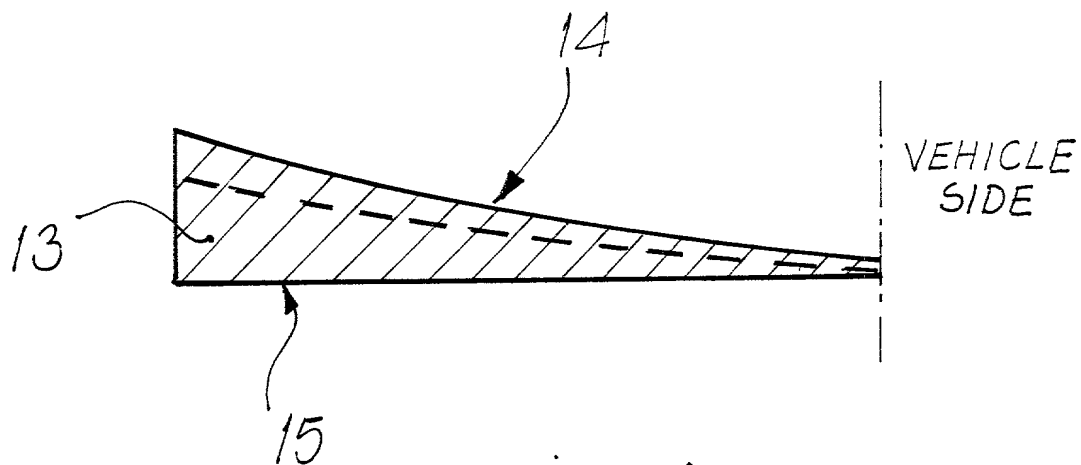


Fig. 4

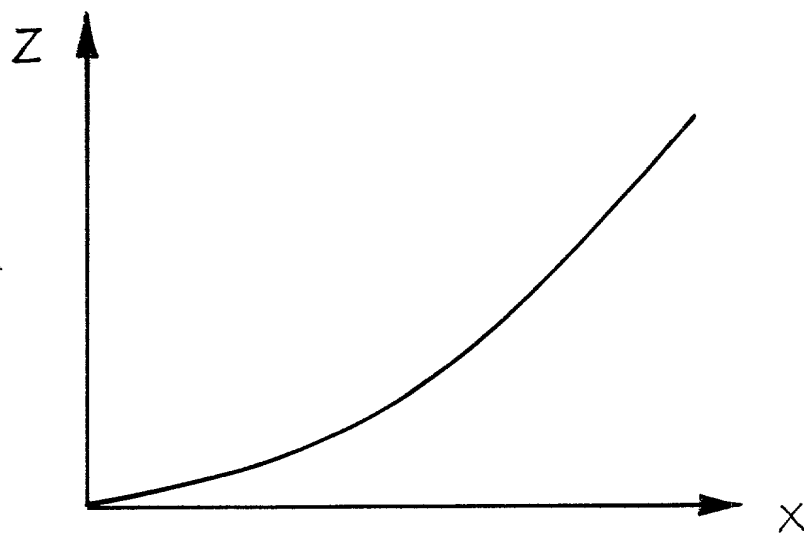


Fig. 5

ANGULAR MAGNIFICATION V

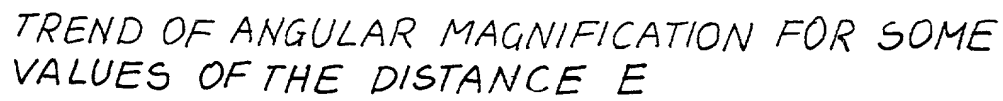


Fig. 6

Declaration and Power of Attorney for patent Application

Dichiarazione e procura ai fini della domanda di brevetto

Italian Language Declaration Docket No.: 33471/GM/vp

Il sottoscritto inventore dichiara che:

La propria residenza, recapito postale e cittadinanza corrispondono a quanto indicato in calce, sotto la propria firma.

Ritiene di essere il primo ed unico inventore originale (se viene elencato in calce un solo nominativo) o il coinventore primo ed originale (se è elencato più di un nominativo) del oggetto rivendicato e per il quale il sottoscritto presenta domanda di brevetto. La invenzione in questione è chiamata

SPECCHIO RETROVISORE AD ANGOLO DI

VISUALE AMPIO E RIDOTTA DISTORSIONE

D'IMMAGINE, PER VEICOLI

e la sua descrizione è allegata alla presente Dichiarazione a meno che non sia spuntata la seguente casella:

- ☐ Il _____
è stata depositata una domanda di brevetto
statunitense numero o una domanda di brevetto
internazionale PCT numero _____
che è stata modificata il _____
(se applicabile).

Il sottoscritto dichiara in oltre di aver letto e compreso il contenuto della descrizione identificata in precedenza, rivendicazioni comprese, come modificati dall'eventuale modifica summenzionata.

Il sottoscritto riconosce l'obbligo di rivelare informazioni essenziali ai fini della determinazione della brevettabilità ai sensi del Titolo 37, Codice dei Regolamenti Federali, §1.56.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

VEHICLE REAR-VIEW MIRROR WITH WIDE

VIEWING ANGLE AND REDUCED IMAGE

DISTORTION

the specification of which is attached hereto unless the following box is checked:

- ☐ was filed on _____
as United States Application Number or PCT
International Application Number _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

Italian Language Declaration

Il sottoscritto rivendico con la presente la priorità prevista dal Titolo 35, Codice degli Stati Uniti, § 119(e)-(d) o § 365(a) in relazione a qualsiasi domanda o domande estere di brevetto o certificato di inventore, o dal Titolo 35, § 365(a) degli stessi Codice in relazione a qualsiasi domanda internazionale PCT nella quale è designato almeno un paese diverso dagli Stati Uniti, I suddetti domande e certificati essendo elencati sotto, e, spuntando le seguenti caselle, ha anche identificato sotto qualsiasi domanda estera di brevetto o certificato di inventore, o domanda internazionale PCT, la cui data di deposito preceda quella della domanda per la quale è rivendicata la priorità.

Prior foreign application(s)
Domande Estere Anteriori
PD99A000062

(Number)
(Numero)

ITALY (ITALIA)

(Country)
(Nazione)

(Number)
(Numero)

(Country)
(Nazione)

Il sottoscritto rivendica con la presente i benefici previsti dal Titolo 35, Codici degli Stati Uniti, § 119(e), in relazione a qualsiasi domanda o domande provvisorie degli Stati Uniti elencate sotto.

(Application No.)
(N° della domanda)

(Filing Date)
(Data di deposito)

(Application No.)
(N° della domanda)

(Filing Date)
(Data di deposito)

Il sottoscritto rivendica con la presente i benefici previsti dal Titolo 35, Codice degli Stati Uniti, § 120, in relazione a qualsiasi domanda o domande statunitensi, o dal Titolo 35, § 365(c) degli stessi Codice in relazione a qualsiasi domanda internazionale PCT nella quale sono designati gli Stati Uniti, I suddette domande essendo elencate sotto e, nella misura in cui l'oggetto di ciascuna rivendicazione di questa domanda non sia stato esposto nella domanda statunitense o internazionale PCT anteriore nel modo previsto dal primo paragrafo del Titolo 35, Codice degli Stati Uniti, § 112, riconosce l'obbligo di rivelare informazioni essenziali ai fini della determinazione della brevettabilità ai sensi del Titolo 37, Codici dei Regolamenti Federali, § 156, le quali diventino disponibili durante il periodo compreso tra la data di deposito della domanda nazionale e la data di deposito nazionale o internazionale PCT della presente domanda.

(Application No.)
(N° della domanda)

(Filing Date)
(Data di deposito)

(Application No.)
(N° della domanda)

(Filing Date)
(Data di deposito)

Con la presente, il sottoscritto dichiara veritiere tutte le affermazioni contenute in questa domanda in relazione alle proprie conoscenze e di ritenere vere tutte le affermazioni o informazioni presentate. Dichiara inoltre che tali asserzioni sono state espresse nella piena consapevolezza che le dichiarazioni intenzionalmente false sono punibili con una multa, l'incarcerazione o entrambe, ai sensi della Sezione 1001 del Titolo 18 del Codice degli Stati Uniti e che tali dichiarazioni intenzionalmente false possono mettere a repentaglio la validità della domanda o di qualsiasi brevetto rilasciato in merito.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventors certificate or PCT International application having a filing date before that of the application on which priority is claimed:

Priority not claimed
Diritto di priorità non rivendicato

25 MARCH 1999 (25.3.1999)

(Day/Month/Year Filed)
(Giorno, Mese/Anno di deposito)

(Day/Month/Year Filed)
(Giorno, Mese/Anno di deposito)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Status) (patented, pending, abandoned)
(Stato) (concessione de brevetto, in corso di esame, abbandono)

(Status) (patented, pending, abandoned)
(Stato) (concessione de brevetto, in corso di esame, abbandono)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Italian Language Declaration

PROCURA: Io, sottoscritto inventore, nomino con la presente il seguente avvocato o avvocati e/o agente o agenti al fine di istruire questa pratica e di condurre tutte le operazioni ad essa pertinenti presso l'Ufficio dei Brevetti e Marchi di Fabbrica: *(Elencare il nome ed il numero di matricola)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

Guido MODIANO (Reg. No. 19,928)

Albert JOSIF (Reg. No. 22,917)

Daniel J. O'BYRNE (Reg. No. 36,625)

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(02) 86.92.442

Nome e cognome dell'unico o del primo inventore Giovanni MANFRE'		Full name of sole or first inventor Giovanni MANFRE'	
Firma dell'inventore	Data	Inventor's signature	Date
Residenza 37042 CALDIERO - ITALIA		Residence 37042 CALDIERO - ITALY	
Via Roma 6		Via Roma 6	
Cittadinanza Italiana		Citizenship Italian	
Recapito o Casella Postale come Residenza		Post Office Address same as Residence	
Nome e completo dell'eventuale secondo coinventore Mario LOCATELLI		Full name of second or joint inventor Mario LOCATELLI	
Firma del secondo inventore	Data	Inventor's signature	Date
Residenza 24030 MOZZO - ITALIA		Residence 24030 MOZZO - ITALY	
Via Panzini 20		Via Panzini 20	
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(Fornire le stesse informazioni e le firme del terzo e degli ulteriori coinventori.)

(Supply similar information and signature for third and sub-sequent joint inventors.)